

CHAPTER 8

Ahead of its time

The Ferguson Formula Zephyr

Amongst upmarket cars in Britain during the 1960s, one which stood out was the Chrysler V8-powered Jensen FF, which incorporated both the 'Ferguson Formula' four-wheel-drive system of Harry Ferguson Research Ltd and Dunlop's Maxaret anti-lock brakes in its unique specification. The fact that in 1967 these sophisticated transmission and braking arrangements accounted for more than £1,500 of the Jensen FF's tax-paid price of £5,340 was quite enough to indicate that four-wheel-drive would remain out of the reach of most motorists for some considerable time to come. Nevertheless, having successfully converted an American Ford Mustang as a one-off venture during 1967, the Ferguson concern then turned its attention to the possibility of producing four-wheel-drive Mk 4 Zephyrs for which there existed quite a large potential market in the shape of the numerous police forces who already ran Zephyrs and in whose hands the benefits of four-wheel-drive could well be able to justify the extra cost. A successful approach to the Home Office resulted in the Government becoming involved, with orders being placed by the Ministry of Technology for a trial batch of 25 four-wheel-drive Zephyrs with automatic transmission, otherwise to police specification, plus 25 normal-drive automatic Zephyrs also to police specification for direct comparative purposes.

Being of large build, the Mk 4 was a relatively easy car to convert but even so it needed floorpan changes in order to accommodate the transfer gearbox, and a slight realigning of the engine off-centre towards the left-hand-side of the car whilst also being raised very slightly was necessary in order to achieve an ideal front-drive run. Two quite different layouts were initially under consideration, with Scheme A being in effect a mirror-image of the left-hand-drive Mustang conversion, whilst an alternative Scheme B suggested the positioning of the transfer box at the rear of the car immediately ahead of the axle rather than just behind the gearbox as on the Mustang. This would have improved the weight distribution, but introduced a further complication in that an extremely long two-piece propeller shaft back from the transfer box to the front-drive unit would have been needed, and in the event it was the Scheme A layout that was proceeded with. All the changes therefore would be concentrated towards the front of the car; in so far as the drive to the rear wheels was concerned, the only difference would be a shorter propeller shaft because the transfer

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box was longer than the standard gearbox extension. With a 37% front/63% rear power split calculated to retain the feel of a normal car, the transfer box utilized chain drive to a differential within the same casing, from where a short propeller shaft ran forward to another differential for the front-wheel drive. The casing for this front differential was included in the side of a new sump of cast aluminium construction; although integral with the sump, the differential housing contained a separate oil supply from that of the engine. One output shaft ran through the sump to emerge at the nearside. The pair of driveshafts to the front wheels had Rotoflex 'doughnut' couplings at their inner ends, with Hardy Spicer outer joints of the type used on BMC's front-wheel-drive Austin 1800.

Redesigned front suspension was necessary to allow the front wheels to be driven, and this involved the deletion of the MacPherson struts. The anti-roll bar and track-control arms were retained in the role of lower wishbones, with Mustang upper wishbones being introduced. Coil springs embracing telescopic shock absorbers were situated above the upper wishbones, and these arrangements necessitated considerable alterations to the Mk 4's inner wing.

A dual-line braking system was used, with the added refinement of anti-lock operation. Situated at the rear of the transfer box and driven from an idler shaft therein, the Dunlop Maxaret anti-lock unit was essentially a rotating mechanical sensing device which operated an electrical switch should rotation of a driveshaft suddenly almost cease due to imminent wheel-lock. The switch was connected to a solenoid-operated double-diaphragm servo control valve incorporated in the braking system. This could instantly relieve the pressure being applied, and re-apply it as necessary, causing the brake pedal to kick back in a pulsating manner under the driver's foot whenever the car was being braked hard enough to induce wheel locking.

In all, this conversion added 240lbs to the weight of the Mk 4 Zephyr, but although this was concentrated on the front wheels, the provision of power steering as standard meant no extra effort for the driver. This extra weight however, coupled with the greater power losses through the more complicated drive, inevitably resulted in a performance decrease, with rather less lively acceleration and a maximum speed down by some 5 or 6mph. Whilst this could be seen as a slight disadvantage on motorway patrol work, particularly under perfectly dry weather conditions, it was of little consequence otherwise and in fact under give-and-take conditions was almost always more than compensated for by the vastly improved traction, especially of course in wet conditions.

An extensive evaluation programme was carried out by numerous police forces, in many cases with one Ferguson Zephyr and one standard model operating strictly in pairs. Fitted with tachographs, and with their allotted drivers alternating on a shift, or even call-out basis, between the Ferguson and the standard car, both Zephyrs would attend the same incident/emergency calls. Unlike routine patrol work, these call-outs were of course always 'full chat' operations, and so an extremely accurate assessment of these cars' capabilities could be made, with the four-wheel-drive models displaying varying degrees of superiority depending upon the distances involved and the prevailing weather conditions. Comments such as 'uncannily surefooted' and even 'it was King of the road' amongst the reminiscences of police drivers involved at the time, serve to indicate that the roadability of these Ferguson Zephyrs was of the highest order.

From the mechanical viewpoint also the Ferguson system appears to

have been a success, seemingly little in the way of serious trouble being encountered with the four-wheel-drive arrangements, although unfortunately these same Zephyrs were not always trouble-free in other respects. Being at the time the only two Zephyrs on their force, the Ferguson car and its standard model companion evaluated by the Leeds City Police are well remembered by police mechanic Peter Tindall, whose job it was to look after these two cars. Big-end failure at only 3,000 miles on the engine of the Ferguson car was an unfortunate occurrence not characteristic of the Mk 4, but in this case it created difficulties when the local Ford agency claimed that the Ferguson sump had invalidated the Ford warranty. It had not in fact, and Ford sorted out the situation. Another engine rebuild following a stripped fibre timing gear and failure of the Ford C4 automatic gearbox are recalled by Peter as two more blemishes on the record of this pair of cars; but in respect of both the four-wheel-drive arrangements as such and the outstanding roadholding they conferred upon the Mk 4, he remains full of praise. Almost nonchalantly climbing an extremely steep snowbound hill which had defeated all attempts by other traffic is remembered, as are some high-speed laps of the Mintex test track at Sherburn, in Yorkshire, where both the Leeds Zephyrs were checked out during some testing of brake pad materials. Here, whereas the normal Zephyr negotiated a tight dumbell section at one end of the track at impressively high speed, but with a series of somewhat untidy tail-end hops, the Ferguson Zephyr went round appreciably faster, leaning hard but never suggesting that it might put a wheel out of place.

A Ferguson Zephyr was also acquired by the Ministry of Defence, although for what purpose is not stated, whilst a similar car, again to police specification, was in use during 1970 with the British School of Motoring's High Performance Course fleet which was based at the Brands Hatch racing circuit. And, not surprisingly, there were one or two other four-wheel-drive Mk 4s, including a Zodiac estate car driven by one of Ferguson's top management.

By this time the police cars had built up considerable mileages, and the official police report to the Home Office following the lengthy evaluation period is known to have been very highly complimentary indeed. The report was classified information at the time and unfortunately does not appear to have survived; a recent search through their records by the archives branch of the Home Office failed to find any trace, and so it is assumed to have been disposed of during the intervening years. Nevertheless, from talking to those involved who had to use and maintain these cars, it can be established beyond doubt that in 1968 the Ferguson company, who remain in business today under the name FF Developments Ltd, were offering a four-wheel-drive system which twenty years later would have been close to 'state-of-the-art'.

The cost of the Ferguson conversion on the Zephyr was approximately £1,000 per car for the limited numbers involved, but reducing to an estimated £400 each on a batch of 5,000 similar models. In relation to what the car had to offer it was a reasonable figure: but at a time when many forces were being directed to buy cheap cars in the interests of economy, it was too much. Despite the enthusiasm of many policemen for the Ferguson Zephyr, the project was doomed to go no further.